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Cold Spring Harbor, on June 25, was as follows: President Stewart Paton's address: "Democracy's opportunity." R. H. Johnson: "Some eugenical aspects of the distribution of wealth." Madison Grant: "The present racial outlook in the world at large." A. H. Estabrook: "The eugenical bearing of psychological work of the army." A. J. Rosanoff: "Preliminary report of a study of the prevalence of chronic psychoses in the population of the State of New York." Anna M. Peterson: "The eugenical aspect of custodial institutions for women." F. Stuart Chapin: "The scientific aspects of field work in the social sciences." C. B. Davenport: "Heredity of twins." H. H. Laughlin: "The eugenical provision of the constitution of the German republic."

FREE public lectures are being delivered in the lecture hall of the Museum Building of the New York Botanical Garden, Bronx Park, on Saturday afternoons, at four o'clock, as follows:

July 17. "Spoilage of fruits and vegetables during transportation and storage," F. C. Meier.

July 24. "The state park at Devil's Lake, Wisconsin," Dr. A. B. Stout.

July 31. "Flowers for the summer garden," G. V. Nash.

August 7. "Diatoms—plants of beauty seen through a microscope," Dr. M. A. Howe.

August 14. "Through the Philippines with a kodak," Dr. H. A. Gleason.

August 21. "How to know, gather and cook the puffballs," Dr. W. A. Murrill.

August 28. "A trip to Colorado," Dr. F. J. Seaver.

In order to provide a method for viewing the collections of the garden under guidance, a docent leaves the front door of the museum building every week-day afternoon at 3 o'clock, to escort all who may wish to accompany him. The routes are as follows: Monday: Hemlock Forest, Mansion and Herbaceous Garden. Tuesday: Pinetum. Wednesday: Fruticetum and North Meadows. Thursday: Deciduous Arboretum, Public Conservatory Range 2, Nurseries, and Propagating Houses. Friday: Public Conservatory Range 1. Saturday: Museums.

UNIVERSITY AND EDUCATIONAL NEWS

DR. RODNEY HOWARD TRUE, of the U. S. Department of Agriculture, has been appointed professor of botany in the University of Pennsylvania, to succeed Dr. John M. Macfarlane, who recently resigned.

DR. WALTER TAGGART has been appointed Blanchard professor of chemistry and director of the chemical laboratory of the University of Pennsylvania, to succeed Dr. Edgar F. Smith.

DR. H. R. KRAYBILL, of the Bureau of Plant Industry, has been appointed professor of agricultural chemistry and head of the department of chemistry of New Hampshire State College.

ADDITIONAL appointments in Colorado College for 1920-21 include, as assistant professor of geology, Mr. I. A. Keyte, B.S. (Missouri), recently head of science work in the Colorado Springs High School, and, as instructor in physics, Mr. Elmer Furnquist, A.M., (Illinois), recently an instructor in that institution.

REINHOLD F. A. HOERNLE, assistant professor of philosophy at Harvard University, has resigned in order to accept a professorship at Durham University.

DR. W. J. DAKIN, professor of biology in the the University of Western Australia, has been appointed to the Derby chair of zoology, University of Liverpool, in succession to the late Professor Leonard Doncaster. Dr. I. M. Heilbron, professor of organic chemistry at the Royal Technical College, has been appointed to the chair of organic chemistry.

DR. BENJAMIN MOORE, of the research staff at Oxford, has been appointed to the new chair of biochemistry.

DISCUSSION AND CORRESPONDENCE

INTERSEXES IN DROSOPHILA AND DIFFERENT TYPES OF INTERSEXUALITY

TO THE EDITOR OF SCIENCE: In your issue of March 26, 1920, there appeared an important article by Dr. Sturtevant, in which he proved that intersexuality may be produced in

Drosophila simulans by the action of a mutant gene. He concludes with the remark:

It has been assumed by Goldschmidt, Hertwig, Banta, and others working with intersexes that in their animals the normal sex-determining mechanism itself was failing to function as usual. The present example shows that such an assumption can not be accepted without proof.¹

May I be allowed to point out some very important distinctions between this present example and the best worked-out of the others, namely Goldschmidt's intersexual moths (*Lymantria*). (1) Sturtevant's intersexual *Drosophila* are all females. Goldschmidt has obtained intersexes in both sexes. (2) The gonads in Sturtevant's example are described as "minute, if present." In *Lymantria*, instead of such marked reduction occurring, the gonad is transformed, partly or wholly, into that typical of the other sex. (3) Most important of all, Sturtevant's flies appear to be all of one type or grade of intersexuality. Goldschmidt's moth intersexes, both male and female, form a continuous series from normality to complete sex-reversal. (4) Goldschmidt's analysis of his material has shown that the *Lymantria* intersexes are zygotes which have started development as individuals of one sex, but at a given point have been switched over to continue as individuals of the other sex. The degree of intersexuality depends on the point of time in development at which the change occurs. It is essential to have an analysis of the *Drosophila* case from this point of view, before further comparison is profitable. (5) When a highly intersexual female *Lymantria* which is functional as a male is mated with a normal female, the sex-ratio in the resulting broods is what would be expected if both parents were of Z W chromosome constitution; the same is true when, instead of high-grade intersexes, such individuals of all male broods as must be supposed to be transformed females are bred from.

With these differences between the intersexuality of *Drosophila* and that of *Lymantria*,

¹ To this list should be added Harrison, *Jour. Genetics*, 9, 1919, p. 1.

we can not be sure that the two are quite comparable, or due to the same set of causes. In conclusion, it may be said that the Columbia School itself has made it exceedingly probable that the function of the sex genes is normally to initiate one series when present in two doses; the one series of reactions allowing of the appearance of the structures and instincts of one sex, the other of those of the other sex. If this is so, then there is theoretically nothing whatever against the possibility of these series of reactions, and the physiological states to which they give rise being altered, (1) by the mutation of independent genes (as appears undoubtedly to be the case in *D. simulans*); (II) by an alteration in the balance between the sex-genes and other factors influencing development, (as would seem more than probable in *Lymantria*); or, (III) by external agencies (as apparently in Hertwig's and Kuschakewitsch's experiments on frogs and Miss King's on toads). The burden of proof, in the present state of our knowledge, lies even more on the upholders of gene-produced intersexuality than on the upholders of the balance theory, but quite possibly both are right.

JULIAN S. HUXLEY

NEW COLLEGE, OXFORD,

May 1, 1920

THE ORIGIN OF OIL

A. W. McCoy has published in *Journ. Geol.* XXVII. (1919), pp. 252-262, evidence that crushing oil shale converts some of the solid organic matter into oil. The conditions of the experiment seem to preclude any chance for much general heating of the mass of shale used.

Can some mathematical physicist tell us whether a strain or shear would cause a high temporary temperature at the point of rupture? The heat would be absorbed by the adjacent rock and would not greatly increase the temperature of the whole mass, unless the quantity of heat were large. Yet the temperature at some points *might* be high enough for a very short time to cause the dissociation of the organic molecules adjacent